Psychological Reports, 1975, 37, 112-114. © Psychological Reports 1975

AGE-RELATED DETERMINANTS OF STRESS-INDUCED WEIGHT CHANGE IN MICE[1]

WALTER B. ESSMAN, FRED KIMMELSTIEL, AND BARRY SPORER

Queens College of the City University of New York

Summary.—25-day-old male mice showed a greater incidence of body weight loss and a late peak of plasma corticosterone elevation when exposed to tobacco smoke for 5 successive days, as compared with mice exposed to filtered smoke (gas phase) or air. 50-day-old mice had a greater incidence and magnitude of body weight loss and a late plasma corticosterone peak after 5 days of air exposure, but not with gas phase or nicotine + gas phase. Diencephalic serotonin, while higher among 25-day-old mice, did not differ as a function of the stress of confinement during exposure to the ventillatory stimulus or as a function of the different stimuli. The results suggest that weight loss and the time following stimulation at which plasma corticosterone is maximally elevated may serve as indices of stress and are consistent even when the stressor-susceptibility is age-related.

The acute exposure of mice to cigarette smoke and/or its biologically active ingredients has been shown to effect changes that relate in several ways to the mediation of stress effects (Selye, 1973). Such relationships, in particular, concern central regulation of ACTH release and the adrenal secretion of corticosterone but more generally concern anabolic measures such as change in body weight. There is good basis for relating weight change both to the age at which it occurs and also to stress-related factors that may affect it as a function of age. The concern of the present study was to investigate the interaction of a stressor event—physical restraint, with exposure to cigarette smoke delivered during five successive daily trials.

A total of 120 male CF-1S strain mice were randomly assigned to groups in which each animal received five daily (8 a.m. to 9 a.m.) exposures to either air, cigarette smoke, or filtered cigarette smoke (delivering the gas phase only with no nicotine or metabolites) for 24 min. in a Walton Upright Smoking Machine. Half of the mice were 25 days old and the others 50 days of age at the start of the study.

Mice were weighed at the beginning and end of the study and at intervals of 15, 30, 45, or 60 min. following the fifth daily exposure, they were killed by cervical dislocation; samples of blood were taken from the abdominal aorta and brain tissue was removed. The plasma was assayed for corticosterone (Zenker & Bernstein, 1958) and the brain tissue was regionally subdivided and assayed for serotonin and 5-hydroxyindoleacetic acid (Welch & Welch, 1969).

Weight differences between mice within any group could not be accounted

[1]This study was supported in part by a grant from the Council for Tobacco Research, U.S.A.

1003540795

Source: https://www.industrydocuments.ucsf.edu/docs/pmpl0000